

**Re: In Trench Treatment****Dave Bartus** to: Singleton, Deborah (ECY)

Cc: ron.skinnarland

Bcc: "Conaway, Kathy (ECY)"

01/12/2011 05:38 PM

Deborah:

I've taken a look at the various document you included in your e-mail for purposes of evaluating the proposal for in-trench macro-encapsulation.

As you know, our previous discussions of in-trench treatment have recognized the conflict between the requirement of 40 CFR 268, incorporated by reference by WAC 173-303-140, which prohibit land disposal prior to satisfaction of applicable LDR treatment standards, and the potential impracticability of placing large debris treated by macro-encapsulation into a mixed waste disposal trench. In the current circumstance, the debris in question seem to be of the size of several inches (3-7", give or take) by 24", exclusive of packaging. Based on the waste designation provided in the attached documentation, I agree that macro-encapsulation is an appropriate treatment technology for mixed debris. However, the size of this debris waste stream does not in any way pose the issue of lack of practicable alternatives to placing macro-encapsulated waste into a mixed waste disposal trench. Therefore, I see absolutely no reason why debris rule treatment standards cannot be fully satisfied prior to placing treated waste into a disposal cell. As far as I can tell, the proposal for in-trench treatment seems to be merely a matter of convenience, which hardly justifies deviation from applicable regulatory requirements.

I'm also curious about the assumed designation of these wastes. The assumption of a total concentration of 100 ppm for the four metals for which the wastes are presumed to designate appears to be an arbitrary assumption. No discussion or consideration of the concentrations of an extract of these wastes via a TCLP extraction. Remember, the designation of wastes for the toxicity characteristic is based on a waste extract, not total concentrations. Since the TCLP extraction procedure uses an extraction fluid twenty times the quantity of the waste sample, the maximum concentration of a particular constituent in the waste extract would be 1/20th of the concentration of the constituent in the waste. This 1/20th bounding concentration assumes that all of each constituent fully leaches from the waste, an assumption that may or may not apply to the wastes in question (likely not). Below I've summarized the assumed waste concentration for cadmium, chromium, lead and silver, the corresponding maximum extract concentration, and the TC regulatory limit:

Constituent Limit	Max. Waste Concentration	Max. Extract Concentration	TC Regulatory
Lead (D008)	100 ppm	5.0 mg/l	5.0 mg/l
Cadmium (D006)	100 ppm	5.0 mg/l	1.0 mg/l
Chromium (D007)	100 ppm	5.0 mg/l	5.0 mg/l
Silver (D011)	100 ppm	5.0 mg/l	5.0 mg/l

From this table, it is essentially impossible for lead, chromium, or silver to be present at or above the TC regulatory limit - for an exceedance to occur, the waste constituent would have to be exactly at the assumed maximum, and fully leach from the waste. If the assumptions are conservative as claimed, the waste would not designation as TCLP waste, and thus not even be subject to LDR treatment requirements. The case of silver, of course, is not as clear, but given the assumptions and this analysis, it may be doubtful that silver would leach from a representative sample above TC regulatory limits.

Since the impurities in the fuel appear to have allowable limits based on fuel specifications, I think it would be much more defensible for Energy to assume the wastes in question were on-specification fuel elements, and replace the assumed 100 ppm concentration with the fuel impurity specification, then apply the TCLP extraction logic outlined above. This would give a much more realistic analysis of the potential (or lack thereof) for the fuel to designate as a mixed waste.

I do agree that obtaining a representative sample of debris wastes is generally problematic, so I'm not suggesting the actual sampling be conducted, I am, however, suggesting that Energy is putting themselves in a difficult box based on "conservative" assumptions not supported by logical analysis.

"Singleton, Deborah (ECY)"

Dave,

01/11/2011 03:02:39 PM

From: "Singleton, Deborah (ECY)" <dsin461@ECY.WA.GOV>
To: Dave Bartus/R10/USEPA/US@EPA
Date: 01/11/2011 03:02 PM
Subject: In Trench Treatment

Dave,

Attached are the files for discussion on in trench treatment. To have time to brief these. Let's plan on meeting on this topic Friday morning.

Deb

----- Message from "Collins, Michael" <Michael.Collins@rl.doe.gov> on Wed, 1 Dec 2010 13:47:09 -0800 -----

To: "Singleton, Deborah (ECY)" <dsin461@ECY.WA.GOV>

cc: "Collins, Michael" <Michael.Collins@rl.doe.gov>, "Miskho, Anthony G" <anthony_g_miskho@rl.gov>

Subject: RE: TREATMENT OF MIXED LOW LEVEL WASTE IN TRENCH 34

Thanks for the quick turnaround.

-----Original Message-----

From: Singleton, Deborah (ECY) [<mailto:dsin461@ECY.WA.GOV>]

Sent: Wednesday, December 01, 2010 12:27 PM

To: Collins, Michael

Cc: Fearon, Lee (ECY)

Subject: RE: TREATMENT OF MIXED LOW LEVEL WASTE IN TRENCH 34

Thanks for the info Mike. Few questions:

1. In your Work Instruction Document, the waste stream is described as High Temperature Gas Reactor (HTGR) fuel drums. In the text you refer to them as HGTR. This correction should be made. OKAY (SAW THIS ONE TOO)
2. In same document, what is the acronym STW STABILIZED (LOW-LEVEL) WASTE
3. Need more detail than just 'debris waste stream'. Do you have a more detailed description of what exactly is HTGR? I'LL GET THE ACCEPTABLE KNOWLEDGE PACKAGE AND SOME OTHER INFORMATION THAT MIGHT BE USEFUL.
4. In the Part A the following language is used: "However, there will be other mixed waste containers that will be stored within the trenches before treatment to meet LDR." Does this statement refer to this particular waste stream? NO If so, then this waste be stored no longer than 90 days? THE TIME TO PLACE THE DRUMS, PLACE THE FORMS, AND POUR THE GROUT WILL TAKE ABOUT FOUR WEEKS.

Thanks.

Deborah

-----Original Message-----

From: Collins, Michael [<mailto:Michael.Collins@rl.doe.gov>]

Sent: Tuesday, November 30, 2010 1:22 PM

To: Singleton, Deborah (ECY)

Cc: Miskho, Anthony G; Collins, Michael

Subject: TREATMENT OF MIXED LOW LEVEL WASTE IN TRENCH 34

Hi Deborah - We plan on treating a debris waste stream in Trench 34.

The Part A was modified sometime back to allow this but we also agreed to provide you the specific procedure to be used. Attached is the following:

- work package/procedure (Monolith Work Document Instructions.pdf)
- attachment 1 to the work package in two parts (2X-10-5054 Attachment #1a.ppt and 2X-10-5054 Attachment #1b.ppt)
- attachment 2 to the work package (aX-10-5054 Attachment #2.doc)
- a waste management procedure referenced in the work package (SW-100-141.docx)
- the waste planning checklist mentioned in the work package (2X-10-5054 WPC.pdf)
- low level waste stabilization pictures - treatment of the mixed low level waste will look the same (Monolith Layout Pictures.pdf)

Sorry about clogging up your computer. Feel free to call if you have any questions.

Mike C.

----- Message from "Collins, Michael" <Michael.Collins@rl.doe.gov> on Fri, 3 Dec 2010 12:11:45 -0800 -----

To: "Singleton, Deborah (ECY)"
<dsin461@ECY.WA.GOV>

Subject: FW: HGTR Trench 34 location

Hi Deborah – Can't see most of it because of the snow but you can see a bit of the concrete base on the left side. Mike C.

From: Miskho, Anthony G [mailto:Anthony_G_Miskho@RL.gov]

Sent: Friday, December 03, 2010 10:57 AM

To: Collins, Michael

Cc: Flyckt, Don L; Swanson, Tara A; Cornelison, Chad; Lang, John J; Miskho, Anthony G; Beiers, E Orinda

Subject: HGTR Trench 34 location

Attached is the picture showing the location of where treatment in trench will occur. The base is concrete.

Tony[attachment "Treatment in trench location1.pptx" deleted by Dave Bartus/R10/USEPA/US]

----- Message from "Collins, Michael" <Michael.Collins@rl.doe.gov> on Mon, 6 Dec 2010 09:02:52 -0800 -----

To: "Singleton, Deborah (ECY)"

<dsin461@ECY.WA.GOV>

Subject FW: In-Cell Treatment Notification to
: DOE-RL/WDOE

Deborah – Attached is the original AK package for the HTGR containers when they were packaged in the 1970s. You'll be getting two more messages providing details of what the waste is. One is all of the appendices to this document. The other is how they were reclassified from TRU waste to MLLW. Note that I had wrongly assumed that they were assayed. Feel free to call if you have any questions. Mike C.

From: Cornelison, Chad [mailto:Chad_Cornelison@RL.gov]
Sent: Wednesday, December 01, 2010 1:18 PM
To: Collins, Michael
Cc: Miskho, Anthony G
Subject: FW: In-Cell Treatment Notification to DOE-RL/WDOE

Here is the AK and brief summary.

Thanks, Chad (509-373-3128).

From: Miskho, Anthony G
Sent: Tuesday, November 09, 2010 2:39 PM
To: Cornelison, Chad
Cc: Nester, Dean E; Catlow, Rene L; Flyckt, Don L; Conley, Jeffrey A; Arnold, Stuart G; Swanson, Tara A; Miskho, Anthony G
Subject: RE: In-Cell Treatment Notification to DOE-RL/WDOE

Hi Chad:

Thank you for the comprehensive email. Since you talked to Mike Collins, I do not want to duplicate your effort. After you meet with Tara tomorrow, please let me know on your recommendation on how to approach Mike.

Thanks

Tony

From: Cornelison, Chad
Sent: Tuesday, November 09, 2010 2:35 PM
To: Miskho, Anthony G
Cc: Nester, Dean E; Catlow, Rene L; Flyckt, Don L; Conley, Jeffrey A; Arnold, Stuart G; Swanson, Tara A
Subject: In-Cell Treatment Notification to DOE-RL/WDOE

I got your voice mail, and the email Dean/Rene were alluding to was for the 42 ANL-E cemented waste drums. The in-cell treatment involves a different waste stream, which I will summarize below.

I talked briefly with Mike Collins about this project and he said the documentation he would need to notify WDOE would be the completed work package that Operations (Jeff Conley/Stuart Arnold) are working on. We should get a status on that work package tomorrow during a meeting Tara Swanson is holding with Operations to discuss details for these activities.

The three attachments include:

1. Operations monolith diagram – the diagram includes 62 containers; 60 HTGR and 2 LLW containers. The HTGR containers are the only ones that undergo treatment in the disposal cell. The other 2 are for radiological stabilization only.
2. AK document for HTGR containers from 303-C Building (300 Area). The AK identifies 70

HTGR containers (62 55-gal drums and 8 110-gal drums). 10 of the HTGR drums are TRU and not part of this project. The remaining 52 55-gal drums and 8 110-gal drums are MLLW debris drums that will undergo MACRO treatment in the disposal cells.

3. Email from Dean identifying the need for this notification.

HTGR Waste Stream Summary

Around 1970 several reactor experiments were conducted in the 300 Area, which generated 70 High-Temperature Gas-Cooled Reactor (HTGR) waste drums containing the graphite fuel blocks. The fuel blocks were bagged and placed into 30-gal inner drums with sand void filler. The inner drums were packaged into 55-gal drums with concrete void filler. The 70 drums were shipped to LLBG in 1977 where they remained in retrievable storage until 2008. When they were retrieved, the 55-gal drums were overpacked into 85-gal drums and the 110-gal drums were overpacked into 7x3x3 ft waste boxes.

The HTGR container process knowledge was reviewed and documented in the attached AK document. The waste was determined to be debris with the following waste codes: D006, D007, D008, and D011. At Hanford, these containers are being managed in treatability group MLLW-07 due to the unusually high amount of uranium in the containers. They contain no TRU isotopes.

Normal disposition pathway for this type of debris waste would be shipment to an offsite treatment, storage, and disposal facility (TSDF) for MACRO treatment, except for the large amounts of uranium. The average quantity of uranium-233 or uranium-235 in this waste stream is 190 grams. One drum comes close to exceeding the TSDF radiological license limits significantly increasing the throughput (3-5 years for 60 containers). Not to mention, that during this time we would be limited to other waste with special nuclear material (SNM) that we could send them, such as the TRU waste for repackaging. In addition, these containers will be DOT type B quantities and fissile and will be extremely difficult to ship as normal DOT shipments (require road closures or special fissile packaging that we do not currently have). With the capabilities to perform MACRO treatment of debris in the Mixed Waste Disposal Units (MWDUs), it will be the best use of resources to treat/dispose these MLLW debris containers in the MWDUs in a compliant manner.

This project includes a two step process. First, Operations will void fill the annulus between the 55-gal inner drums and the 85-gal overpacks to ensure they are 90% full. This activity will be conducted in doors at one of the Central Waste Complex (CWC) storage modules. The second step will include MACRO of the containers in a designed configuration as provided in the attached diagram for criticality control. The containers will be completely encapsulated with grout that will meet the 40 CFR 268.45 alternative treatment standard for debris.

Let me know if you have any further questions or how I can help, this is one of my highest priorities and I am willing to assist you as needed.

Chad D. Cornelison
M/LLW Disposition Project
phone: 509-373-3128
fax: 509-372-0437

[attachment "WMP-31393_303C4B AK_Rv0.pdf" deleted by Dave Bartus/R10/USEPA/US]

----- Message from "Collins, Michael" <Michael.Collins@rl.doe.gov> on Mon, 6 Dec 2010 09:03:25 -0800 -----

To: "Singleton, Deborah (ECY)"
<dsin461@ECY.WA.GOV>

Subject FW: In-Cell Treatment Notification to
: DOE-RL/WDOE

HTGR containers.

From: Cornelison, Chad [mailto:Chad_Cornelison@RL.gov]
Sent: Wednesday, December 01, 2010 2:34 PM
To: Collins, Michael
Subject: RE: In-Cell Treatment Notification to DOE-RL/WDOE

The PDF didn't include the Appendices for some reason. Here they are.

All Retrieved Waste was assumed TRU until assayed, hence the AK was written assuming it would be TRU. These were never assayed due to the waste matrix and possible shielding issues (produce invalid assay results). Each individual PIN's data/burial record was reviewed and the 60 LLW drums contained no TRU isotopes, therefore they cannot be TRU. The rad characterization was based on good process knowledge information.

Thanks, Chad (509-373-3128).

From: Cornelison, Chad
Sent: Wednesday, December 01, 2010 1:18 PM
To: Collins, Michael S
Cc: Miskho, Anthony G
Subject: FW: In-Cell Treatment Notification to DOE-RL/WDOE

Here is the AK and brief summary.

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Sent: Tuesday, November 09, 2010 2:39 PM
To: Cornelison, Chad
Cc: Nester, Dean E; Catlow, Rene L; Flyckt, Don L; Conley, Jeffrey A; Arnold, Stuart G; Swanson, Tara A; Miskho, Anthony G
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Cc: Nester, Dean E; Catlow, Rene L; Flyckt, Don L; Conley, Jeffrey A; Arnold, Stuart G; Swanson, Tara A
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Chad D. Cornelison
M/LLW Disposition Project

phone: 509-373-3128

fax: 509-372-0437

[attachment "AppendixC- 303C-Chemical List.doc" deleted by Dave Bartus/R10/USEPA/US] [attachment "AppendixB-303-C Containers&Contents-rev3.doc" deleted by Dave Bartus/R10/USEPA/US] [attachment "AppendixA-303CW4B-DES-01.pdf" deleted by Dave Bartus/R10/USEPA/US] [attachment "AppendixD-Assumptions.doc" deleted by Dave Bartus/R10/USEPA/US]

----- Message from "Collins, Michael" <Michael.Collins@rl.doe.gov> on Mon, 6 Dec 2010 09:03:52 -0800 -----

To: "Singleton, Deborah (ECY)"
<dsin461@ECY.WA.GOV>

Subject: FW: HTGR Rad Characterization

From: Cornelison, Chad [mailto:Chad_Cornelison@RL.gov]

Sent: Friday, December 03, 2010 1:59 PM

To: Collins, Michael

Cc: Miskho, Anthony G

Subject: HTGR Rad Characterization

Mike, as discussed in the AK document the drums were planned to be assayed. Waste Retrieval Project determined that valid assays could not be obtained for these containers due to the waste matrix interferences and shielding. They were transferred to storage as suspect-TRU without assay based on process knowledge. While at storage, the process data was reviewed and determined to be adequate to classify as MLLW (see first attachment). The primary sources of data were the AK document reviews and the burial records. As referenced in the AK, report PNL-7178, *Summary of HTGR Benchmark Data from the High Temperature Lattice Test Reactor*, was used to provide the isotopic values (see Table 2 below, Uranium values only).

Table 2. Estimated Uranium Distributions.				
		Uranium Wt% Distributions		
		Isotope	²³⁵ U Distribution	²³³ U Distribution
		²³² U	None	8 ppm
		²³³ U	None	97.44
		²³⁴ U	0.57	1.05
		²³⁵ U	93.69	0.09
		²³⁶ U	0.30	0.007
		²³⁸ U	5.43	1.41

The burial records provide the amount in grams of radioactive material (e.g., uranium-233, uranium-235, and thorium). The ratios above in the table were used for the amount of radioactive material identified on the burial records. The burial records list the grams of total uranium and U-235 or U-233, as well as kilograms of thorium. The Nuclear Material Transaction Report also lists the amount of radioactive material: #20 = U-235, #88 = thorium, #70 = U-233. There is a little understanding needed to glean the information from the burial records. For example, the "Pu" identified on the burial records does not mean these containers have actual plutonium; uranium and thorium were historically part of the TRU programs

(these containers were generated in the late 1970's). The testing and burial records for these 60 HTGR drums show no plutonium constituents, therefore they cannot be TRU.

10 HTGR drums with plutonium are TRU and are not included in this population for in-cell treatment; they will remain in the TRU Program. The TRU information in the AK document is applicable to those 10 drums only. The non-radiological sections of the AK document are applicable to both MLLW and TRUM drums. Which drums contain plutonium and uranium are clearly identified in the burial records.

Let me know if this sufficient.

Chad D. Cornelison
M/LLW Disposition Project
phone: 509-373-3128
fax: 509-372-0437

----- Message from "Ware, Nancy W" <nancy_w_ware@rl.gov> on Thu, 29 Apr 2010 06:18:00 -0800 -----

To: "Cornelison, Chad" <chad_cornelison@rl.gov>

"Reaksecker, Sean D" <sean_d_reaksecker@rl.gov>, "Nester, Dean E" <dean_e_nester@rl.gov>, "Austin, Richard L" <richard_l_austin@rl.gov>, "Martin, Marty L" <marty_l_martin@rl.gov>, "Pyzel, Donald R" <dona

cc: <richard_l_austin@rl.gov>, "Martin, Marty L" <marty_l_martin@rl.gov>, "Pyzel, Donald R" <dona

Todd" <todd_gordon@rl.gov>, "Bushore, Robin P" <robin_p_bushore@rl.gov>, "Levinskis, David" <

Subject: RE: HTGR TRU Activities

SWITS has been updated for these containers. The addendum with files will be sent to Records for inclusion in IDMS under separate email.

Description and reason for Changes:

Drums of retrieved waste were previously managed as Suspect TRU waste. The isotopes remain the same, as do the CPS remarks. The waste is calculating out to be LL waste. Therefore the SWITS Basic Info tab was updated to reflect LLW, and the containers of waste will be managed from this point forward as LLW.

Nancy

From: Cornelison, Chad

Sent: Wednesday, April 28, 2010 12:27 PM

To: Ware, Nancy W

Cc: Reaksecker, Sean D; Nester, Dean E; Austin, Richard L; Martin, Marty L; Pyzel, Donald R

Subject: FW: HTGR TRU Activities

Nancy, attached is the list of 60 LLW 303C (HTGR) debris drums we need to switch in SWITS from TRU to LLW. They are all currently stored in 2403WB together. M/LLW Disposition Project has reviewed the burial records and AK documentation and we concur with the TRU Project that these are MLLW waste. They currently calc in SWITS as LLW, but they are toggled TRU in SWITS. These should be managed as MLLW drums, can you please make the changes in SWITS and notify Operations of the change. The radiological data and isotope inventory, including fissile category (CPS Container Type X4) will not be affected by this update.

Let me know if you have any questions or need additional information to prepare an Addendum if needed.

Thanks, Chad (509-373-3128).

From: Reaksecker, Sean D
Sent: Tuesday, March 30, 2010 11:45 AM
To: Cornelison, Chad
Subject: HTGR TRU Activities

Chad,

The attached list has the drums we want to switch to LLW along with the TRU activity that is calculated by SWITS. I also queried the treatability group that is assigned to each currently so you can see what's in there. The ones that have a TRU activity above 0 have trace amounts of Pu listed. I think these probably didn't get updated when Robin was correcting them. They all have identical activities for the various Pu/Am isotopes which came from an update that retrieval did, the addendum for this is also attached. Let me know what you want to do about these ones.

Can you let me know when they get toggled to LLW so we can update EDMT accordingly? Thanks.

Sean Reaksecker

Office: (509) 373-0833

Fax: (509) 373-5251

200W/MO-281/B-110 /T4-10

[attachment "List of PINs and Info.pdf" deleted by Dave Bartus/R10/USEPA/US] [attachment "Addendum for 60 LLW Drums.pdf" deleted by Dave Bartus/R10/USEPA/US] [attachment "HTGR Burial Record Example.pdf" deleted by Dave Bartus/R10/USEPA/US]